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AUTHOR Hodges, Walter L.
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ABSTRACT

The difficult work of identifying effective research strategies in early education has recently begun. Second generation model-derived programs are just beginning to emerge. To learn from these programs, evaluators must identify four criteria of critical differences existing among programs and attack the programmatic analysis of these differences with vigor. The four criteria are specification of: (1) the process through which program goals and instructional objectives are generated or selected (the view of child development involved and the manner of accounting for societal press), (2) the conditions or processes to be used to insure the willful interaction of the target population with these goals and instructional objectives (the appropriate incentive conditions), (3) the appropriate sequence for the introduction of learning opportunities or the strategies required to enable the programmer to order instructional objectives in some sequence, and (4) the strategies required of the teacher or programmer for organizing the learning situation for optimal benefit to children. Admittedly, generic approaches and the functional equivalence of models pose additional difficulties for evaluators but these can be overcome by directing preliminary efforts toward understanding the relationship of a model to a complete educational system. (WY)

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Author: Walter L. Hodges, Ph.D., Professor of Education and Psychology

Address: Southwest Center for Early Childhood Personnel Development
State College of Arkansas
Conway, Arkansas 72032

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The Implications of Design and Model selection for the Evaluation of Programs for the Disadvantaged Child

Walter L. Hodges, Ph. D.

Early educational intervention has been seen as a potentially potent force in reducing the negative consequences that upbringing within poverty environments has upon children's schooling. But, if the hypothesis is true that dramatic changes can be made to occur which will enhance the coping skills of children in schools the alternative hypothesis of dramatic changes for reducing the effectiveness of children must be seriously considered. It may be determined, for example, that programs generated from certain viewpoints are effective by some criteria, but for the short run, and deleterious to more optimal development in the long run. Other programs may yield little apparent progress toward short run criteria, but optimize later development. The educational and psychological research community can hardly delay the analysis of critical variables among these programs when so much is at stake. We cannot defend the null hypothesis under circumstances which may prove us wrong because of the lack of the necessary and sufficient measurement, evaluation, or analytical tools. Similarly, we cannot be content with the fact that many programs are better for some disadvantaged children (by someone's criteria) than what presently exists in infant care, day care, preschool, and early elementary programs.

Implications for research and leads for the evaluation of programs for the early education of disadvantaged children <u>can</u> be derived from the

analysis of various models of early intervention. The word model refers to that finite number of varying approaches to early education which are used to guide the development of some portion or all of a program for children, usually for the age ranges of three to eight or nine. The word program refers to a particular curriculum drawn largely from one of the theoretical models along with the necessary support system for delivery of that curriculum to children.

Unfortunately, for research purposes, these models and their derivative programs, are often neither internally consistent nor completely independent of one another. In fact, there are overlaps among models which may serve to obscure major differences in programs and, thereby limit appropriate interpretations of evaluative or experimental data. Principles, objectives, strategies, and management procedures of one model may be beneficial to programs derived from different models, but for many reasons sufficient interaction among model builders has not occurred. One of the major reasons for the lack of such interaction is that research workers and educators have not themselves been free of the stereotyped, negative responses to alternative models so often ascribed to the lay public.

There may be even more basic constraints on our understanding. On two recent occasions I was privileged to sit in informal sessions including highly intelligent and humane research and development persons representing Piagetian and behavioral analysis points of view with respect to early education. It was disheartening to discover the fact that over the combined periods of several hours and with honest efforts to do so --

little meaningful communication occurred. As one who sometimes participated in these discussions, as one who has been dabbling in some model building himself, and as one who is looking for the common threads among existing models these experiences were distressing. I went to learn of common themes and divergences for program and research leads and came away with little.

These discussions, while assuredly not representative of all those who are engaged in translating models into programs, certainly served to point out the all-or-none fallacy of our thinking. Bereiter and Engelmann (1966) and David Elkind (1970) have been persuasive in their arguments for the possible benefits of the academic preschool for disadvantaged children as compared to the inappropriateness of the same curriculum for more advantaged children. But, the implications of their writings suggest differentiated programming for <u>groups</u> of children based on social class. This suggestion is just the reverse of the heart of the argument used by Lloyd Dunn (1968) as he marshalled the knowledge of the last decade to effectively destroy (for some of us, at least) the mystique of special classes for the mildly retarted. I take Dunn's argument to be for differentiation <u>within</u> classroom units rather than differentiation <u>between</u> these units. It seems imminently appropriate to ask the more cogent question of what strategies and what objectives, with what kinds of adults, from what models or theoretical biases, will do how much good for which children: And conversely it seems imminently unfair to expect that any model with its attendant strategies and objectives can produce programs for all children, for all poor children, or for all middle class children.

It may be that the field of experimental early education suffers in another way from the all-or-none fallacy. One example of this level of the all-or-none fallacy in print may suffice. Edith Levitt (1968) argues that the process approach (mediational, Piagetian, information processing) is a more sophisticated and more valid concept of cognitive function than the product approach (a strictly associationistic interpretation of SR Theory which is used as the exemplar of the "product" approach). The product approach to learning should be reassessed and education re-oriented towards the process approach to learning, according to the author. Of 29 references in the article in question the only one given to the reader for an examination of SR theory is a paper on "An Academically Oriented Pre-School for Culturally Deprived Children" by Engelmann, Osborn, and Reidford reprinted in Fred Hechinger's paperback book entitled Pre-School Education Today printed in 1966. But this article is only one sympton of what I believe is throwing out the baby with the bath water. There is much too much to be gained from the behavioral analysis of educational transactions to seriously consider cognitive theories to the exclusion of SR approaches or method.

There is no logical reason that the whole of a child's early schooling or upbringing must be dominated by curriculum, sequence, incentive conditions, or teaching organization derived from one model as many would imply that it should. Neither, must a classroom be guided solely from such a unitary approach. Since models vary on their relative emphasis on such important variables as sequence, incentive conditions,

and teaching and learning strategies it may be healthy to encourage a wise eclecticism at least among a number of the experimentalists. For example, it is possible, and likely profitable, for some children to be under direct tutelage for a portion of the day and provisions made for his freedom to select activities during other portions. (As a matter of fact, such programming does occur in most preschools, but few data are available with respect to the effectiveness of various modes of pacing). But an eclecticism, to be wise, must be guided by appropriate criteria, by language among models which can be translatable, and by classification schemes which assure that comparisons among models are aimed at the same phenomena.

Attempts to order models of early education along meaningful continua have suffered from the multiplicity and sometimes conflicting nature of goals and objectives, the overlapping nature of various provisions for, or assumptions about, the necessary incentive conditions, the equivocal nature of program sequencing, and the lack of a clear definition of the role of the teacher. Merle Karnes (1969) and Dickie (1968) chose the continuum of level of structure within programs as the critical variable among the several possible differences among those programs compared. It may be that differences in structure are more obvious, more readily scaled, and therefore, more available for empirical study than other variables. The fact that structure may be easy to see is, however, no reason for assuming that it is the most critical variable. Confounded with the concept of program structure is the role of the

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teacher as it is projected from the several models. It would be possible to identify a continuum of teacher behavior related to presentation modes, feedback strategies, and diagnostic interactions quite independent of program structure which will provide a useful research paradigm. Such scales could be drawn from the models and applied to the analysis of classroom behavior to determine first, if the models generate different teaching styles and second, to identify what may be more critical dimensions of model differences. Answering the question of what teachers are required to do under various model derived programs is essential.

Any model of early education, to be helpful in program design, should meet four criteria and specify, 1) the process through which program goals and instructional objectives are generated or selected (the view of child development involved and the manner of accounting for societal press), 2) the conditions or processes to be used to insure the willful interaction of the target population with these goals and instructional objectives (the appropriate incentive conditions), 3) the appropriate sequence for the introduction of learning opportunities or the strategies required to enable the programmer to order instructional objectives in some sequence, and 4) the strategies required of the teacher or programmer for organizing the learning situation for optimal benefit to children (the assumptions about learning inherent in the model).

There are few in the field of experimental early education who will claim to have a model in the sense just described, to be sure. But various rubrics have been used to differentiate those approaches which

are used to guide program development. Both the Follow-Through and Head Start programs refer to program models such as those of behavioral analysis, the open school individually prescribed instruction, the academic preschool, the cognitive preschool, and so on. More generically, these models have been generated from different philosophical-theoretical positions. Lawrence Knohlberg (1968) in his review of cognitive-developmental theory briefly describes the positions of the nativist-maturationists, and the behavioristic-social learning advocates. William Rohrer (1970) in an excellent chapter on cognitive development and education has analyzed in some detail the instrumental-conceptual and cumulative-learning positions of Jerome Bruner and Robert Gagne, respectively. Lillian Katz (1969) differentiated two major approaches to preschool education as "traditional" and "experimental". She saw the major distinction between the two approaches as differences in teacher behavior with respect to, 1) who initiates the classroom action (teacher or child) and, 2) what role the teacher plays with respect "to reinforcement". Joan Bissell (1970) a slightly more fine grained analysis in her doctoral dissertation, and separated approaches on the basis of, 1) general teaching strategy from permissive to structured and 2) on major curriculum input including enrichment, cognitive, information, environment. She then classified 20 programs under these dual criteria into categories of Permissive Enrichment, Structured Cognitive, Structured Informational, and Structured Environment. In addition to this first analysis Bissell reviewed each program for its general objective (development of whole child, development of learning processes, and teaching of learning

processes), the degree of structure provided, the nature of the structure, and the specific objectives for children.

Frances Horowitz and Lucille Paden (1970) have suggested yet another dimension for describing the position of the model builders on the basis of how disadvantaged children are viewed with respect to their school difficulties. They point out that some investigators approach the problem from a deficit functioning point of view. Others assume that the disadvantaged child has suffered from distortions in his socialization. Finally, the authors point out that the most parsimonious explanation for school failure among disadvantaged children is that they have learned a large repertoire of competing responses. Any one of these three positions held to the exclusion of the other two suggests significant differences in the programming of educational opportunities.

In addition to the several classificatory and descriptive suggestions listed above there is also the very attractive and expedient alternative of dividing models on the basis of the priority of the general outcomes expected. These outcomes include such terms as skill development, learning to learn (Rambusch, 1962), academic (reading) readiness, cognitive processes (Kamii, 1970), motivation to learn, language, self-concept, or socialization.

Finally, the model approaches to early education are sometimes aimed at a specific age (kindergarten, nursery), special subgroups of children (bilingual, American Indian), or for particular institutional settings (day care, home, public school).

Although not an exhaustive list, each of these efforts to classify the variables among different models of early education combined with the four criteria for an adequate instructional system now make it possible to conceptualize the multidimensional and overlapping nature of programs derived from different models. The task of developing a set of matrices to adequately describe model differences is one important, and indeed, critical step in the refinement of efforts to make meaningful comparisons within-and across-models.

Such matrices can provide an initial format for determing the internal consistency of programs derived from a single model. Second, these matrices can be used to isolate differences among variables within one or more of the basic parameters of a model. The isolation of differences between programs derived from the same model will allow for the experimental analysis of effects of single variables on children. And third, these matrices will help idenfity major and more subtle differences between models. For example, two programs derived from a maturationist viewpoint (model) may differ on the teacher behavior espoused while holding target population, materials, priority program objectives, and instructional objectives constant. The development of these two programs from a single model conducted by several teachers in each program, and using the classroom as the unit of analysis can be used to generate useful data regarding general teaching strategies in natural settings.

Similarly, behavioristic and cognitive-developmental programs

may be derived which differ in priority program objectives, but hold constant specific instructional objectives, teacher behaviors, target population, and materials. Such programs will make it possible to gather data which will shed some light on differences between theoretical approaches.

In actual practice sophisticated examples of this type of research are difficult to develop. In the first place, the criteria of internal consistency within a particular theoretical model may preclude variation on critical dimensions which warrant comparative exploration. Second, the expense of program development is high and the added cost of implementation over a range of classes for each variation is almost prohibitive. Finally, even if the programs were developed in this fashion, the effects of isolated differences among these within-model or across-model variations may be masked by the overall influence of any experimental program which is applied with groups of children who vary on initial entry level capabilities and previous learnings.

A more parsimonious strategy may be to generate miniature subsystems from each of the models and test these in short term experimental programs to gain some information on the relative efficiency of learning, the stability of the concept learned, and the transferability of the concept to new situations. Such an experimental approach will require the selection of subsets of instructional objectives which are common across models. Such common instructional objectives can be found, particularly in the affective or interpersonal domains of

development and among those programs which have made explicit objectives public. These cross-model mini-experiments should be conducted in sufficient numbers to enable the evaluator to build some reasonsble network of information about program components of each model as compared with other models.

It will be difficult, however, to find a significantly large set of instructional objectives which hold sufficient commonality across models to be fruitful without a considerable amount of shared discussion among advocates of different prototypes.

Finding common objectives is a problem that leads one to suggest that evaluation must not be directed solely to the effectiveness of an early childhood program with respect to how well it achieves its objectives. The adequacy, consistency, explicitness of that program's objectives must be a subject of evaluation, too. The evaluation of program and instructional objectives is not only a priority but it is also a necessary procursor to the long-range accumulation of knowledge with respect to how we provide for children's education. The argument is not that there is a set of objectives for early education that will be acceptable across the board. The point is that there are too few adequately stated, well-conceptualized, generally acceptable objectives and too little communication about those that are available to allow for the determination of what is appropriate for comparison.

This discussion of objectives leads into the implications of the first of the four criteria for a model of early education stated earlier.

Let us return to these four and examine each in turn for research implications.

(1) Program Goals and Instructional Objectives.

The processes through which program goals and instructional objectives are generated or selected vary along several dimensions. The first dimension is that of the degree of adherence to a theoretical or hypothetical view from which an early education model is derived. Some models are patently eclectic and select, or generate objectives from several points of view. The infant stimulation project of Betty Caldwell at Syracuse (1968) is by her own admission an example of one type of such eclecticism. Other models derive goals and objectives from a nativistic-maturational, behavioristic-learning, cognitive-developmental, cumulative learning, or phenomenological point-of-view. Stating goals and instructional objectives may also be a-theoretical and pragmatic in some models, particularly where the model is based on deficit functioning, competing response, or distorted socialization assumptions about non-middle class children. In these instances goals and objectives are generated directly from the assumed needs of a group of children. As suggested earlier a critical issue for research and evaluation is in the area of the generation of objectives.

As I have attempted to show, program goals and instructional objectives are derived from a variety of sources. They are value laden constructs. Limitations of value data however, are not sufficient reasons to dismiss this basic program parameter as being outside the realm of empirical analysis. To paraphrase Robert Stake (1970): In order to understand what an early childhood model is doing requires an understanding

of what a program derived from that model is expected to do. Only by making model assumptions public and clearly stating explicit objectives can the research worker or the public to whom the program is addressed make their own judgments.

Stake (1970) goes on to point out that the personal value-commitments, aims, goals, objectives, perceived norms, and standards of a program are judgment data and an analysis of these data can reveal what some people, or person, wants the program to achieve. An analysis of these judgment data may make it possible to reduce the sometimes acrimonious polemics embedded in the field of experimental early education to manageable proportions. (One result of the lack of an analysis of goals and objectives among both experimental and traditional models has been the premature dismissal by advocates of one or another model of the positive values in other models.) A systematic analysis of program goals and objectives may be of even greater benefit, however, if the common subsets of instructional objectives among two or more models are identified. Common subsets of objectives framed in acceptable terminology will facilitate the comparative study of programs by allowing the use of common evaluative criteria. Divergence among where objectives between models will also be made clear by such an analysis. An explicit statement of the variations among model objectives can reduce considerably the obscurity surrounding program differences.

(2) Interaction of Children With Instructional Objectives

The conditions or processes used to insure the willful interaction

of the children with the goals and objectives of a model also vary. Incentive conditions for children are not necessarily deducible from program goals and instructional objectives. Any model of early education which purports to be a complete system must deal with and explicate those conditions necessary for eliciting and maintaining the involvement of children in learning. It is on this issue that much of education in the United States appears to be foundering and it is this issue which is probably the most critical one to be evaluated within any model of early education.

There are at least two ways in which early education models vary in their approach to eliciting involvement of children. The first is the nature of the structure of the programs. In some programs the material, classroom, and the total non-human environment is structured in such ways as to provide feedback to the child as he operates on his environment. An example of this approach is found in Nimnicht's (1970) explanation of "A Model Program for Young Children that Responds to the Child." Other programs provide structure through the teacher (Bereiter, Engelmann, 1966), and still others are structured by the children (the open school).

On a more specific level, different models assume that for non-middle class children a variety of incentive conditions are required. These include, for various models, primary and secondary reinforcement, knowledge of results, reflection, imitation, expansion, novelty, complexity, mystery, modeling, curiousity arousal, and uncertainty.

It is not clear from present analyses of the visible models of early education that each of them provide directions as to what it is within their

programs that gets children hooked into the system. It is, however, important and, indeed, critical that such derivations be made and that data be collected on the relative effectiveness of different approaches.

(3) Sequential Order of Programming

The behavioristic-cultural learning models have been most explicit in defining the processes for preprogramming in logical sequence the associations, motor and verbal chains, discriminations, concepts, and rules to be learned by the child. Hierarchical sequences of structures and processes dominate the work of Becker, Engelmann, and Thomas (1969), and Resnick (1967). Gagne (1970) is probably the most eloquent spokesman for the cumulative learning approach and his partially complete theory of instruction has been used to guide early curricula for mathematics and science (Gagne, 1968).

On the other hand the nativist-maturationists have denied the necessity for such sequentially arranged hierarchies and have been eager to espouse the necessity of a curriculum following the lead of the child. (Minuchin and Biber, 1968). No effort is made to program a hierarchical sequence of learnings and every effort is made to program the teacher to respond appropriately to child behavior indicative of a teachable moment.

These two widely divergent points of view, derived from differing models of early education, provide fairly explicit anchor points for a scale analysis of the degree of sequential learning episodes across programs.

(4) Organizing the Learning Situation

The fourth criterion for a viewpoint of early education to be accepted as an instructional system for the field is the extent to which the derived

programs are provided leads from the model with respect to the provision of the external conditions of learning. These conditions include the degree to which diagnostic determinations of learning status or entry level are used, the amount of variance in scheduling left to teacher determination, the use of unprogrammed time, the teacher or adult-pupil ratios needed, other strategies for accounting for individual differences, and the space and material requirements.

Problems of Installation

It is possible that the appropriate field testing and ultimate installation of model derived programs will depend on a number of factors which have received little attention from the program developer. These factors are an appropriate domain for educational, sociological, and psychological research. Innovative, experimental programs in the hands of charismatic originators and embedded in, or near, research and development settings often show gains on evaluative criteria that are not replicable as the program is moved into more naturalistic field settings. Apparently potent reform programs have degenerated into simple administrative forms when tried by those other than the originators. It is suspected, but few data are yet available, that the more complete, structured programs suffer least from exportation to the field and that the less structured, more child directed programs suffer most. If such is the case, experimental programs must account for whatever biases are operating for some programs for reasons irrelevant to the basic nature of the program.

True models which conform to the four essential criteria are

particularly subject to field-installation problems. The reasons can be enumerated in familiar terms: (1) the installation or field testing of a complete model requires administrative support activities and commitments that are not typical of the installation of partial programs (like a new basal reading series adoption); (2) the model may lack face validity in the sense of being outside the realm of experience of those persons responsible for the day-to-day conduct of the model; (3) the psychological involvement of the personnel may be insufficient to insure sustained efforts through the ever present problems of initial installation; (4) the effectiveness of pre-installation training of field staffs often suffers from misinterpretation of the model goals, objectives, and strategies (through the attempt to absorb new information into existing knowledge).

Failures in any one, or more, of these areas may well result in the degeneration of a model to a form without substance. For example, in some communities Head Start Day Care Programs or model kindergartens exhibit all the external surface characteristics of an innovative program but fail to change the basic philosophy or interaction patterns of those who work directly with children. These types of changes can be labelled "administrative changes." Any administrative changes (those without concurrent changes in within class interaction procedures) have a poor showing in the history of educational reform. Special classes for the mildly retarded and the emotionally handicapped have been essentially administrative responses to educational need. The efficacy of these classes in optimizing child development is in serious question but in re-segregating class or racial groups their efficacy is unquestioned (Dunn,

1968). Other administrative responses to the need for educational reform have failed to yield satisfactory solutions to basic problems. Changes in teacher-pupil ratio, differentiated staffing, team teaching, non-graded primary programs are but a few examples of administrative reform unaccompanied by the visible enhancement of children's progress.

The same fate may await early education programs based on the models listed in this paper and carefully designed by sophisticated psychologists and educators unless we need the lessons from the recent history of educational reform.

These points are essentially another way of stating the age-old problem of product versus process reforms in educational practice. They suggest that research and evaluation efforts must be directed toward transactional analyses within classrooms and between adults and children to ascertain the degree to which programs dreamed of become programs practiced.

The field installation of model programs of early education also implies basic changes in the institution itself. Such changes are those that must take place in the primary grades when innovative kindergartens are introduced; that must take place in parent education when educational day care is provided; and that must take place in intermediate grades when primary programs are changed. The empirical analysis of these concommitant changes is needed to insure that programs do not fail because of external constraints as opposed to internal weakness.

Problems of Generic Solutions Based on a Model

Edmund Gordon (1970) has recently called to our attention the "generic solution" problem. This problem holds some implications for research with disadvantaged young children. Some models imply a solution to the problems of schooling for entire sub-populations such as the urban-ghetto black, the rural Appalachain White, or the speakers of non-English languages. But the problem of the match of educational opportunities with the given aptitudes and attitudes of individual children is much too complex to assume that any single model will suffice for any large population of children. The general potency of some models may seduce the research worker as well as the practitioner into ignoring the individual failures within programs in favor of the overall mean gains of groups of children.

For this reason some models, may hold more initial promise than others. The Individually Prescribed Instruction system is tailored to the entry behavior of individual children and allows for the self-pacing of learning episodes. Basic concepts of some models such as the British infant schools (of the nativistic-maturational, social learning type) provide for peer interaction and self-directed activities. In a sense, the child makes his own match. Other models (Bereiter-Engelmann, 1966) do not clearly indicate how the match between learner and learning episode is made. Those models which do not provide for modification based on child growth may lead to serious loss for some children if the model is seen as a generic solution.

It is appropriate to experimentally explore the possibility that

different facets of different models may be combined and recombined in order to maximize learning for individual children. For example, incentive conditions derived from a behavioristic-cultural learning approach may be combined with the organization and sequence of a cognitive-developmental approach. Those children who enter the cognitive developmental program with self-evaluative skills may need few of the consequent stimuli provided by the behavioristic approach. On the other hand, it would be surprising to find self evaluators among large numbers of disadvantaged children and the straight forward principles of reinforcement available from the behavioral analysis of learning may be appropriate.

The Problem of Functional Equivalence of Programs

David Weikart (1969) reported a comparative study of three preschool curricula at the 1969 meeting of the Society for Research in Child Development. He reported substantial gains among the children involved on several criteria and in all of the programs. He then hypothesized a functional equivalence of programs based on a set of variables which have more to do with program administration or quality control than with the internal program processes. These variables included the training of personnel, degree of program supervision, and teacher-pupil ratio. The implications for model comparison and research on installation and field-testing are apparent.

In summary, it should be clear that the difficult work of identifying effective research strategies in early education is just beginning. Second-generation model-derived programs are just beginning to emerge. If we

are to learn from the greater clarity of these programs we must identify those critical differences existing among models and attack the programmatic analysis of these differences with renewed vigor.

As a result of the different models being developed, it has been suggested that research may well focus on:

(1) Miniature sub-systems derived from different models;

(2) The analysis of the program goals and objectives of the various models;

(3) The analysis of the degree to which a model is sufficient to generate a complete instructional system;

(4) The identification of common evaluative criteria;

(5) The design of appropriate incentive conditions for learning;

(6) The problems of field-testing and installation of model-derived programs;

and

(7) The analysis of combinations of program components derived from different models.

Clearly the natural settings of experimental early education can be fruitful for learning about learning, for learning about children, and for learning about teaching. Much needs to be done in the way of analyzing program components and the effects upon the development of the child in the long course of events. Let us proceed in an orderly fashion, with appropriate humility, and above all let us be sure that we do improve the quality of life for the children in our programs.

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